

FORM PTO-1390 (REV 10-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 1511.00002	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold;">097/889130</div>	
INTERNATIONAL APPLICATION NO. PCT/JP00/00160		INTERNATIONAL FILING DATE 14 January 2000		PRIORITY DATE CLAIMED 18 January 1999	
TITLE OF INVENTION PESTICIDAL RESIN COMPOSITIONS AND PESTICIDAL PRODUCTS <div style="text-align: center;">FORMED FROM THE SAME</div>					
APPLICANT(S) FOR DO/EO/US Akira Tabuchi, Kiyozumi Tani, Akiyoshi Inubushi, Atushi Kamada, Masaharu Kamei and Osamu Igarashi					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)). 4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 					
Items 11 to 16 below concern document(s) or information included:					
<ol style="list-style-type: none"> 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input type="checkbox"/> Other items or information: 					

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Karen A. Sanderson

(Signature of person mailing paper or fee)

17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	860.00
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	4 - 20 =	0	X \$18.00	\$	0.00
Independent claims	1 - 3 =	0	X \$80.00	\$	0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$	860.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
SUBTOTAL =				\$	860.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$	860.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$	
TOTAL FEES ENCLOSED =				\$	860.00
				Amount to be	\$
				refunded:	
				charged:	\$

- a. ☒ A check in the amount of \$ 860.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23-0785. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Jeffrey L. Clark
Wood, Phillips, VanSanten, Clark & Mortimer
500 West Madison Street, Suite 3800
Chicago, IL 60661-2511
(312) 876-1800

SIGNATURE: *Jeffrey L. Clark*
 NAME: Jeffrey L. Clark
 29,141
 REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
)
AKIRA TABUCHI et al) PESTICIDAL COMPOSITIONS
) AND PESTICIDAL PRODUCTS
Corres. to PCT/JP00/00160) FORMED FROM THE SAME
)
Serial No. (unassigned))
)
Filed (herewith))

PRELIMINARY AMENDMENT

Box PCT
Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants wish to amend their above-identified application as follows:

IN THE CLAIMS:

Amended claim 3 is as follows:

3. (Amended) A pesticidal product formed from any one of the pesticidal resin composition according to claim 1.

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Karen A. Sanderson

(Typed or printed name of person mailing paper or fee)

Karen A. Sanderson
(Signature of person mailing paper or fee)

Please add new claim 4 as follows:

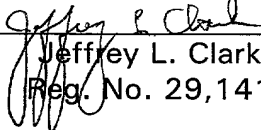
--4. A pesticidal product formed from any one of the pesticidal resin composition according to claim 2.--

R E M A R K S

By this Preliminary Amendment, multiple dependencies have been removed from the claims to place the application in proper U.S. form. Applicants believe the application is now in condition for allowance. Early notification to that effect is respectfully requested.

Respectfully submitted,

WOOD, PHILLIPS, VAN SANTEN,
CLARK & MORTIMER

By _____
Jeffrey L. Clark
Reg. No. 29,141

July 12, 2001

500 West Madison Street
Suite 3800
Chicago, IL 60661-2511
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Marked Up Version of Claims

3. (Amended) A pesticidal product formed from any one of the pesticidal resin composition according to [any one of claims] claim 1 [and 2].

DESCRIPTION

PESTICIDAL RESIN COMPOSITIONS AND PESTICIDAL PRODUCTS
FORMED FROM THE SAME

5

Technical Field

The present invention relates to pesticidal resin compositions and pesticidal products formed from the same.

10

Background Art

15

There exists a problem in that intrusion of insects or the like into electric equipment or transport equipment causes malfunctions or disorders thereof. For example, a TV receiver causes heat inside thereof, which may attract pests such as insects or spiders, which intrude into the inside of the TV receiver through small holes on a rear side thereof, and cause malfunction through short-circuit of a circuit, or the like. Such intrusion of insects or the like causing disorders sometimes occur in computers, telephone switchboards, industrial robots or the like.

20

To address the above problem, it is conceivable to prepare a pesticidal substance carried on a resin material used for structural member, exterior member, fluid transferring pipe, drive member or the like of the instruments.

25

As a resin material having a pesticidal property, there have been proposed a soft resin such as a low molecular weight straight-chain polyethylene resin, polypropylene resin or polyvinyl chloride resin that is blended as a matrix resin with an insecticide or the like. These resins are of the type that is capable of holding a large volume of a chemical agent such as an insecticide, but has a drawbacks, namely a poor strength, poor heat resistance and poor chemical resistance. Therefore, a product which is formed by using such a resin

composition itself as a forming material is greatly limited in its application, and therefore is only applicable to such as a cat collar for which little strength is required (see Japanese Patent Application Laid-open Numbers Hei-6-315332, 5-284871, and 6-141724).

5 A so-called engineering plastic has an excellent heat resistance and chemical resistance. However, it usually exhibits a poor capability in carrying the chemical agent mentioned above. As a result, such a plastic mixed with the chemical agent exhibits no sustained release, produces no pesticidal effect or loses the pesticidal effect in a short period of time even if the initial effect can be
10 produced, or poses any other drawbacks.

Summary of the Invention

 In consideration of the problems with the prior arts, it is an object of the present invention to provide a resin composition that has such a heat resistance
15 and chemical resistance as to enable the resin composition to be used as a structural member or the like, as well as being capable of exhibiting the pesticidal activity for a prolonged period of time.

 Specifically, according to the present invention, there is provided a pesticidal resin composition that contains (A) at least one resin selected from
20 polyamide resins and polyacetal resins (hereinafter referred simply to "A component" in some cases), (B) at least one compound selected from sulfone amide derivatives, sulfonic acid ester derivatives, phosphoric acid ester derivatives, phosphazene derivatives, carboxylic acid amide derivatives, carboxylic acid ester derivatives (hereinafter referred simply to "B component" in some cases), and (C) a
25 chemical agent having a pesticidal property (hereinafter referred simply to "C component" in some cases).

 With the pesticidal resin composition containing the above ingredients, it

is possible to obtain a pesticidal product that has such a strength, heat resistance and chemical resistance as to render the product usable as a structural member, as well as being capable of exhibiting the pesticidal activity for a prolonged period of time.

5 According to the present invention, the pesticidal resin composition may be mixed with (D) a fibrous inorganic filler (hereinafter referred simply to "D component"). The composition mixed with the fibrous inorganic filler can preferably achieve more improved sustained release. Also, the mixture of the fibrous inorganic filler is preferable since it contributes to improvement of
10 mechanical property.

 According to the present invention, there is also provided a pesticidal product formed from any one of the pesticidal resin compositions mentioned above. The pesticidal product may be manufactured by forming the pesticidal resin composition directly into a desirable shape, or by extruding the same and forming it
15 temporarily into pellets or the like for storing and distributing. The forming to the pellets enables the shaping of the product by a known method.

Best Mode for Carrying out the Invention

 As specific examples of the polyamide resins in (A) at least one resin
20 selected from polyamide resins and polyacetal resins, it can be cited polyamide resins such as polyamide-6, polyamide-66, polyamide-11, or polyamide-12 resin, and aromatic polyamide resins such as polyamide-MXD or polyamide-6T resin.

 As specific examples of the polyacetal resins, it can be cited a homopolymer comprising oxymethylene unit only, as well as a copolymer comprising
25 oxymethylene unit as a main component and a different copolymer unit such as oxyethylene unit as an accessory component, cross-linked polymer formed by the cross-linkage therebetween or graft copolymer formed by graft copolymerization

therebetween.

It is possible to use, as the A component, solely the one selected from the polyamide resins or the one selected from the polyacetal resins, or the mixture comprising two or more resins selected from these resins.

5 The polyamide resins or polyacetal resins used as the A component in the present invention may be used in the form of alloy with different resins as far as it does not deteriorate the effects produced by the present invention. As specific examples of resins which can be employed as the different resins in this alloy, it can be cited polyethylene, polypropylene, polystyrene, acrylonitrile-butadiene-styrene
10 resin, polyethylene terephthalate, polybutylene terephthalate, polycarbonate, polyarylate, polyphenylene ether, thermoplastic polyurethane, liquid crystal polyester and the like. These may be used as being mixed into the (A) component in an amount of less than 70 weight parts.

It is conceivable that at least one compound selected from (B) sulfone
15 amide derivatives, sulfonic acid ester derivatives, carboxylic acid amide derivatives, carboxylic acid ester derivatives can dissolve and hold the (C) component, thus achieving an action enabling the composition to have sustained release.

As specific examples of the carboxylic acid ester derivatives among those used as the (B) component, it can be cited an alkyl ester, aromatic ester or the like
20 of various carboxylic acids, for which a hydroxyl group, nitro group, amino group, epoxy group, halogen or the like may be substituted. Particularly, those with the hydroxyl group, epoxy group or the like are preferable for their favorable compatibility with polyamide.

As specific examples of the carboxylic acid ester derivatives, it can be cited
25 phthalic acid ester derivatives such as dimethyl phthalate, diethyl phthalate, di-n-octyl-phthalate, diphenyl phthalate, benzyl phthalate, dimethoxy-ethyl-phthalate, 4,5-epoxy-hexahydro-phthalic-acid-di(2-ethyl hexyl), 4,5-epoxy-cyclohexahydro

phthalic acid (7,8-epoxy-2-octenyl), 4,5-epoxy-cyclohexahydro-phthalic acid-di(9,10-epoxyoctadecyl), 4,5-epoxy-cyclohexahydro-phthalic acid-di(10,11-epoxyundecyl), phthalic acid-di(tetrahydrofurfuryloxyethyl), various phthalic acid mixed esters and an ethylene oxide adduct of a phthalic acid mixed ester,

5 isophthalic acid ester derivatives, tetrahydrophthalic acid ester derivatives, benzoic acid ester derivatives such as parahydroxy benzoic acid butoxyethyl, parahydroxy benzoic acid cyclohexyloxy ethoxy ethoxyethyl, parahydroxy benzoic acid 2-ethylhexyl, hydroxybenzoic acid ester of ω -alkyl (oligo) ethylene oxide and a parahydroxy benzoic acid adduct of an undecyl glycidyl ether, propionic acid ester

10 derivatives such as thiodipropionic acid di(tetrahydrofurfuryloxy ethyl), adipic acid ester derivatives, azelaic acid ester derivatives, sebacic acid ester derivatives, dodecane-2-acid ester derivatives, maleic acid ester derivatives, fumaric acid ester derivatives, trioctyl trimellitate ester derivatives, citric acid ester derivatives such as tri(butoxy ethoxyethyl)citrate, di-n-octyl-mono(nonyl phenoxy ethyl)citrate,

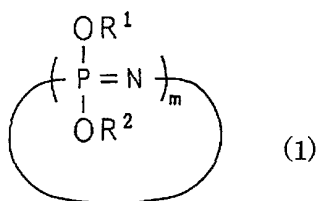
15 tri-n-octyl citrate, dioctyl(tetrahydrofurfuryloxy ethyl)citrate, trimyristyl citrate and triethyl citrate, itaconic acid ester derivatives, oleic acid ester derivatives such as tetrahydrofurfuryl oleate, ricinoleic acid ester derivatives, lactic acid ester derivatives such as (n-butyl)lactate, (2-ethylhexyl)lactate, (n-butoxyethoxyethyl)lactate, (ethoxy-n-octoxyethyl)lactate and (n-

20 decyloxyethoxyethyl)lactate, tartaric acid ester derivatives such as di(ethoxyoctoxyethyl)tartrate and (n-octyl) (nonylphenoxyethyl)tartrate, malic acid ester derivatives such as dibutoxyethyl malate, di(n-butoxyethoxyethyl)malate, distearyl malate and octadecynyl isononyl malate, salicylic acid ester derivatives such as a salicylic acid adduct of an benzyl glycidyl ether.

25 As specific examples of the phosphoric acid ester derivatives, it can be cited trimethyl phosphate, triethyl phosphate, tributyl phosphate, tris(2-ethylhexyl)phosphate, 2-ethylhexyldiphenyl phosphate, tributoxyethyl phosphate,

triphenyl phosphate, crezyldiphenyl phosphate, isodecyldiphenyl phosphate, tricresyl phosphate, trixylenyl phosphate, tri(chloroethyl)phosphate, dimethylphenyl diphenyl phosphate, and tetrakis(2,4 di-tertiary-butylphenyl)4,4'-biphenylen diphosphonate.

- 5 It can be cited, as specific examples of the phosphazene derivatives, cyclic phosphazene compounds having the general formula (1)

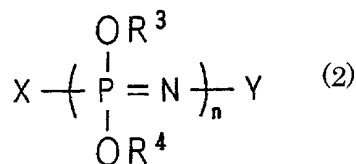


- 10 in which

m stands for an integer of 3 to 25,

R¹, R² are equal or different and represent a C₁₋₈-alkyl group and a phenyl group which may be substituted with a C₁₋₈-alkyl group and/or aryl group,

- 15 as well as straight chain phosphazene compounds having the general formula (2)



in which

- 20 n stands for an integer of 3 to 1000,

R³, R⁴ are equal or different and represent a C₁₋₈ alkyl group and a phenyl group which may be substituted with a C₁₋₈ alkyl group and/or aryl group,

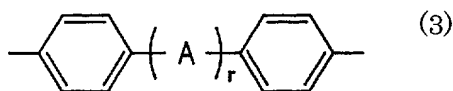
X represents a group: ·N=P(OR³)₃, group: ·N=P(OR⁴)₃, group: ·N=P(O)(OR³) or group: ·N=P(O)(OR⁴),

- 25 Y represents a group: ·P(OR³)₄, group: ·P(OR⁴)₄, group: ·P(O)(OR³)₂ or group: ·P(O)(OR⁴)₂,

as well as at least one phosphazene compound selected from the aforesaid phosphazene compounds

in which

two oxygen atoms resulting from the releasing of alkyl groups or the like from substituents R^1 , R^2 , R^3 , R^4 are linked to each other via at least one crosslinking group selected from the group consisting of o-, m-, p-phenylene group, biphenylene group and groups having the general formula (3)



in which

r represents 0 or 1,

A represents a group: $-\text{SO}_2-$, $-\text{S}-$, $-\text{O}-$, or $-\text{C}(\text{CH}_3)_2-$.

As specific examples of the cyclic phosphazene compounds having the general formula (1), it can be cited hexa-phenoxy-cyclo-triphosphazene, octa-phenoxy-cyclo-tetraphosphazene, deca-phenoxy-cyclo-pentaphosphazene, hexa-propoxy-cyclo-triphosphazene, octa-propoxy-cyclo-tetraphosphazene, and deca-propoxy-cyclo-pentaphosphazene.

As specific examples of the straight chain phosphazene compounds having the general formula (2), it can be cited chain phosphazene compounds each having a chain dichlorophosphazene with which a propoxy group and/or phenoxy group are substituted.

As specific examples of the crosslinking structure having the general formula (3), it can be cited 4,4'-sulfonyldiphenylene(bisphenol-S-residue), 4,4'-oxydiphenylene group, 4,4'-thiodiphenylene group, and 4,4'-diphenylene group.

These phosphazene derivatives each may have a portion or portions which

are substituted with an amino group and/or phenylamino group.

Those phosphazene derivatives each may be solely used, or the mixture of two or more derivatives may be used. Also, the mixture of a cyclic phosphazene and a straight chain phosphazene may be used.

5 As a specific example of the carboxylic acid amide derivatives, it can be cited N-cyclohexyl benzoic acid amide or the like.

As specific examples of the sulfone amide derivatives, it can be cited N-methyl-benzenesulfonamide, N-ethyl-benzenesulfonamide, N-butyl-benzenesulfonamide, N-cyclohexyl-benzenesulfonamide, N-ethyl-P-
10 toluenesulfonamide, N-butyl-toluenesulfonamide, and N-cyclohexyl-toluenesulfonamide.

As a specific example of the sulfonic acid ester derivatives, it can be cited benzene sulfonic acid ethyl or the like.

As the (B) component, one derivative selected from sulfone amide
15 derivatives, sulfonic acid ester derivatives, carboxylic acid amide derivatives and carboxylic acid ester derivatives may be solely used, or a mixture of two or more derivatives selected therefrom may be used.

The (C) chemical agent having a pesticidal property is a chemical agent exhibiting pesticidal activity against various agricultural harmful insects,
20 insanitary insects or pests such as any other insects, spiders, mites or rats. It can be cited as the (C) chemical agent compounds exhibiting a pest repellent activity, compounds exhibiting insecticidal, miticidal, spidericidal, rodenticidal or any other pesticidal activity, compositions exhibiting antifeedant activity, pest growth control activity, and the like.

25 As specific examples of the chemical agent having such a pesticidal property, it can be cited chloronicotinyl insecticides such as imidacloprid insecticide, compounds having silicon atoms such as silafluofen, carbamate compounds such as

benfuracarb, alanicarb, metoxadiazone [5-methoxy-3-(2-methoxyphenyl)-1,3,4-oxadiazole-2(3H)-one], carbosulfan, phenobcarb, carbaryl, methomyl, propoxur and phenoxycarb, pyrethroid compounds such as pyrethrin, allethrin, d1,d-T80-allethrin, d-T80-resmethrin, bioallethrin, d-T80-phthalthrin, phthalthrin, resmethrin, furamethrin, proparthrin, permethrin, acrinathrin, etofenprox, tralomethrin, phenothrin, d-phenothrin, fenvalerate, empenethrin and prarethrin, tefluthrin, organophosphorous compounds such as dichlorovos, fenitrothion, diazinon, malathion, propaphos, fenthion, trichlorform, naled, temephos, fenclophos, chlorpyriphosmethyl, ciafos, calcrofos, azamethiphos, pyridafenthion, propetamphos and chlorpyriphos, as well as their isomers, derivatives and affinities.

As specific examples of the compounds exhibiting pest growth control activity, it can be cited methoprene, pyriproxyfen, kinoprene, hydroprene, diofenolan, NC-170, flufenoxuron, diflubenzuron, lufenuron and chlorfluazuron.

As specific examples of miticides, it can be cited kelthane, chlorfenapyr, tebufenpyrad, pyridaben, milbemectin, and fenpyroximate. As specific examples of rodenticides, it can be cited scilliroside, norbormide, zinc phosphide, thallium sulfate, yellow phosphor, antu, warfarin, coumarine, coumatetralyl, bromadiolone and difethialone.

As the (D) fibrous inorganic filler, those having an average fiber diameter of 0.05 to 10 μ m, an average fiber length of 3 to 150 μ m are preferably used, and it can be cited as specific examples thereof potassium 4-titanate fiber, potassium 6-titanate fiber, potassium 8-titanate fiber, titania fiber, monoclinic titania fiber, silica fiber, wollastonite and zonotlite. These may be each solely used or used as mixed with each other. Among these fibrous inorganic fillers, the potassium 8-titanate fiber is most preferable.

The fibrous inorganic filler is preferably mixed into a compound because it

achieves more improved sustained release. Also, the mixture of the fibrous inorganic filler is preferable since it contributes to improvement of mechanical property.

While the fibrous inorganic filler may be used as it is, it may be subjected to surface treatment with a surface treating agent such as a silane coupling agent such as amino silane, epoxy silane and acrylic silane, or a titanate coupling agent.

An inorganic filler such as zeolite may be used together in a resin composition of the present invention to such an extent as not to deteriorate the object of the present invention.

While the mixing proportion of each component in the resin composition of the present invention may be suitably set according to an actually selected component, a usual proportion is such that the (B) component is set within the range of 0.05 and 100 weight parts and preferably 2 and 50 weight parts, and the (C) component is set within the range of 0.01 and 30 weight parts and preferably 0.1 to 20 weight parts with respect to 100 weight parts of the (A) component

Where the (D) component is mixed, its mixing proportion is preferably 2 to 60 weight part with respect to 100 weight parts of the (A) component. When the mixing proportion of the (D) component is more than 60 weight parts, it poses a difficulty in shaping. On the contrary, when the mixing proportion is less than 2 weight parts, a mixing effect of the fibrous inorganic filler may not sufficiently produced.

The pesticidal resin composition of the present invention may be manufactured for example by mixing the respective components together, and then melting and kneading the same. The respective components may be mixed together by dry-blending technique using a tumbler, blender, mixer, etc. Alternatively, the mixing of these components may be made by the feeding of the components through the same hopper or different hoppers of a kneading machine.

The pesticidal resin composition obtained may be directly formed into a desirable shape for use as a pesticidal product, or may be extruded and formed temporarily into pellets or the like for storing and distributing. The reason for forming the composition to the pellets or the like is that they may be processed into a shape by a known method.

For shaping the pesticidal resin composition of the present invention, various known shaping techniques may be employed. For example, injection molding, extrusion molding, press molding, blow molding, or machining technique may be used.

The pesticidal product of the present invention is not necessarily limited to a specific shape. Rather, it may be formed in flat plate, stick, cylinder, comb, sphere, or any shape.

The pesticidal resin composition may be combined with conventional resin compositions, metals or the like, and formed into such as a structural member in two or more than two colors, a desirable part of which structural member exhibiting the pesticidal activity.

EMBODIMENTS

The present invention will be discussed in more detail by illustrating embodiments and comparative examples as below.

Embodiments 1 to 3 and Comparative examples 1 to 4

By using a biaxial extruder of 45 mm ϕ with a resin temperature set at 190 °C, the (A) component (for which polyamide 12, represented by "PA" in the type-indicating fields of the TABLES herein, was used as a polyamide resin) was poured thereinto and molten. The polyamide 12 used is marketed under the name "DAIAMID L-1940" and manufactured by DAICEL-HÜLS LTD. The mixture of the (B) component (for which N-butyl-benzenesulfonamide, represented by "A" in

the type-indicating fields of the TABLES herein, was used as a sulfone amide derivative) and the (C) component (for which permethrin, represented by "A" in the type-indicating fields of the TABLES herein, was used as a pesticide) in the proportions stated in the TABLE 1 or 2 was placed into the biaxial extruder through a side hopper thereof with pressure by a plunger pump and formed into pellets. Thus, the resin compositions of the embodiments 1 to 3, and the comparative examples 1 to 4 were obtained.

The molded articles for the testing each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm and length of 40 mm were prepared by an injection molding machine, using the pellets obtained.

However, the resin composition of the comparative example 4 had a chemical agent bled-out on the surfaces of the pellets, so that an injection molded article could not be prepared.

TABLE 1

Embodi- ments	(A) component		(B) component		(C) component		(D) component		Pesticidal activity		
	Types	Mixed amts.	Types	Mixed amts.	Types	Mixed amts.	Types	Mixed amts.	7 days	3 months	6 months
1	PA	80	A	15	A	5	-	-	○	△	×
2	PA	75	A	15	A	10	-	-	○	○	×
3	PA	65	A	15	A	20	-	-	○	○	×
4	POM	85	A	10	A	5	-	-	○	△	×
5	POM	80	A	10	A	10	-	-	○	△	×
6	POM	70	A	10	A	20	-	-	○	○	△
7	PA	80	A	15	B	5	-	-	○	△	×
8	PA	75	A	15	B	10	-	-	○	△	×
9	PA	65	A	15	B	20	-	-	○	△	△
10	PA	80	B	15	A	5	-	-	○	△	×
11	PA	75	B	15	A	10	-	-	○	△	×
12	PA	65	B	15	A	20	-	-	○	△	△
13	PA	80	C	15	A	5	-	-	○	△	×
14	PA	75	C	15	A	10	-	-	○	△	△
15	PA	65	C	15	A	20	-	-	○	○	△
16	PA	70	A	15	A	5	A	10	○	○	△
17	PA	60	A	15	A	5	A	20	○	○	△
18	PA	65	A	15	A	10	A	10	○	○	○
19	PA	55	A	15	A	10	A	20	○	○	○
20	PA	55	A	15	A	20	A	10	○	○	○
21	PA	45	A	15	A	20	A	20	○	○	○

TABLE 2

Compara- tive exam- ples	(A) component		(B) component		(C) component		(D) component		Pesticidal activity		
	Types	Mixed amts.	Types	Mixed amts.	Types	Mixed amts.	Types	Mixed amts.	7 days	3 months	6 months
1	PA	85	A	15	-	0	-	-	×	-	-
2	PA	95	-	0	A	5	-	-	○	×	-
3	PA	90	-	0	A	10	-	-	○	×	-
4	PA	80	-	0	A	20	-	-	-	-	-
5	POM	90	A	10	-	0	-	-	×	-	-
6	PP	80	-	0	A	20	-	-	-	-	-
7	EVA	80	-	0	A	20	-	-	-	-	-

Embodiments 4 to 6 and Comparative example 5

By using a biaxial extruder of 45 mm ϕ with a resin temperature set at 185 °C, the (A) component (for which polyacetal resin, represented by "POM" in the type-indicating fields of the TABLES herein, was used) was poured thereinto and molten. The polyacetal resin used is marketed under the name "DURACON M90-44" and manufactured by POLYPLASTICS CO., LTD. The mixture of the (B) component (for which N-butyl-benzenesulfonamide was used as a sulfone amide derivative) and the (C) component (for which permethrin was used as a pesticide) in the proportions stated in the TABLES 1 or 2, was placed into the biaxial extruder through a side hopper thereof with pressure by a plunger pump and formed into pellets. Thus, the resin compositions of the embodiments 4 to 6, and the comparative example 5 were obtained.

The molded articles for the testing each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm and length of 40 mm were prepared by an injection molding machine, using the pellets obtained.

Embodiments 7 to 9

The resin compositions of embodiments 7 to 9 were obtained in the same manner as the first embodiment except for the (C) component, for which methoxydiazone (a pesticide represented by "B" in the type-indicating fields of the

TABLES herein) was alternatively used.

Also, the molded articles for the testing each having a cylindrical shape with an inner diameter of 15mm ϕ , thickness of 1.5 mm and length of 40 mm were prepared by an injection molding machine, using the pellets obtained.

5 Embodiments 10 to 12

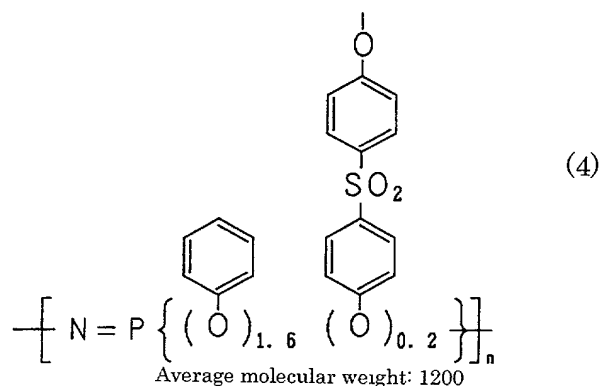
The resin compositions of embodiments 10 to 12 were obtained in the same manner as the first embodiment except for the (B) component, for which parahydroxybenzoic acid 2 ethylhexyl (a carboxylic acid ester derivative, represented by "B" in the type-indicating fields of the TABLES herein) was alternatively used.

Also, the molded articles for the testing each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm and length of 40 mm were prepared by an injection molding machine, using the pellets obtained.

Embodiments 13 to 15

The resin compositions of embodiments 13 to 15 and the comparative example 8 were obtained in the same manner as the first embodiment except for the (B) component, for which a phosphazene composition, represented by "C" in the type-indicating fields of the TABLES, having the general formula (4) stated below was alternatively used.

Also, the molded articles for the testing each having a cylindrical shape with an inner diameter of 15mm ϕ , thickness of 1.5 mm and length of 40 mm were prepared by an injection molding machine, using the pellets obtained.



Embodiments 16 to 21

By using a biaxial extruder of 45 mm ϕ with a resin temperature set at 190 °C, the (A) component (for which the same polyamide resin as the first embodiment was used) was poured therein and molten. The polyamide resin used is marketed under the name "DAIAMID L-1940". The mixture of the (B) component (for which N-butyl-benzenesulfonamide was used as a sulfone amide derivative) and the (C) component (for which permethrin was used as a pesticide) in the proportions stated in the TABLE 1 was placed into the biaxial extruder through a side hopper thereof with pressure by a plunger pump. Then, the (D) component (for which potassium 8-titanate fiber, represented by "A" in the type-indicating fields of the TABLES herein, having an average fiber diameter of 0.5 μ m and average fiber length of 18 μ m was used as a fibrous inorganic filler) was fed via a side-feed. The potassium 8-titanate fiber used is marketed under the name of "TISMO-D" and manufactured by OTSUKA KAGAKU KABUSHIKI KAISHA. The resultant was then formed into pellets. Thus, the resin compositions of the embodiments 16 to 21 were obtained.

The molded articles for the testing each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm and length of 40 mm were prepared by an injection molding machine, using the pellets obtained.

Comparative example 6

By using a biaxial extruder of 45 mm ϕ with a resin temperature set at 240 °C, 80 weight parts of polypropylene resin, represented by "PP" for convenience in the type-indicating fields of the (A) component was poured therein and molten. The polypropylene resin used is marketed under the name of "UBE POLYPRO" and manufactured by UBE INDUSTRIES LTD. 20 weight parts of the (C) component (for which permethrin was used as a pesticide) was placed into the biaxial extruder through a side hopper thereof with pressure by a plunger pump, and then the

resultant was formed into pellets. Thus, the resin composition of the comparative example 6 was obtained.

The molded articles for the testing each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm and length of 40 mm were also prepared for the resin composition of the comparative example 6 by an injection molding machine in the same manner as each embodiment.

Comparative example 7

By using a biaxial extruder of 45 mm ϕ with a resin temperature set at 150 °C, 80 weight parts of ethylene-vinyl acetate resin, represented by "EVA" for convenience in the type-indicating fields of the (A) component in the TABLES, having a vinyl acetate content of 32 % by weight, was poured therein and molten. The ethylene-vinyl acetate resin used is marketed under the name of "ULTRASEN 750" and manufactured by TOYO SODA KABUSHIKI KAISHA. 20 weight parts of the (C) component (for which permethrin was used as a pesticide) was placed into the biaxial extruder through a side hopper thereof with pressure by a plunger pump, and then the resultant was formed into pellets. Thus, the resin composition of the comparative example 6 was obtained.

The molded articles for the testing each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm and length of 40 mm were also prepared for the resin composition of the comparative example 7 by an injection molding machine in the same manner as each embodiment.

Test example 1

The molded articles for the testing obtained in the respective embodiments and comparative examples were left in an atmosphere of 25°C. After the elapse of 7 days, three months and 6 months respectively, gauzes, which are manufactured by TORAY INDUSTRIES, INC., and marketed under the name of "TETORON C-119 SKYLARK", were attached to the opposite ends of the molded articles and

prepared five test objects each keeping one spider (*agelena limbata*) therein were prepared for each embodiment and comparative example. The life or death of *agelena limbata* was confirmed in 24 hours.

The life or death of *agelena limbata* was determined by applying stimuli thereto with a pincette. That is, when no reaction has been observed, it has been determined as being dead.

The test results are shown in the TABLES 1 and 2.

The evaluation of the pesticidal activity shown in the TABLES 1 and 2 was made based upon the proportion of the died test objects with respect to all the test objects (i.e., 5 test objects).

In the TABLES, the symbols, \bigcirc , \triangle and \times respectively represent the death rates of the *agelena limbata*, namely not less than 80 %, between 40 to not more than 80 % and not more than 40 %.

Test example 2

Test pieces were prepared by an injection molding technique, using the resin compositions of the embodiments 1 and 4, and the comparative examples 6 and 7, and the tests were conducted to determine the pulling strength (ASTM D638), flexural strength (ASTM D790), heat deflection temperature (ASTM D648, 4.6 kg/cm²) and gasoline resistance.

To evaluate the gasoline resistance, the test pieces each having a cylindrical shape with an inner diameter of 15 mm ϕ , thickness of 1.5 mm, and length of 40 mm were immersed in gasoline (regular gasoline manufactured by IDEMITSU PETROCHEMICAL CO., LTD.) for 24 hours, and then changes of the test pieces in length were measured just after taking the test pieces out of gasoline.

The test results are shown in TABLE 3.

In the TABLE 3, the symbols \bigcirc and \triangle respectively represent the changes of not more than 0.2 % and not less than 0.2 % in length, and \times

represents a molten state.

TABLE 3

	Pulling strength (kgf/cm ²)	Flexural strength (kgf/cm ²)	Heat deflection temperature (°C)	Gasoline resistance
Embodiment 1	370	600	135	○
Embodiment 4	550	800	145	○
Comparative Example 6	330	400	108	△
Comparative example 7	<50	<50	<40	×

5 As is apparent from the test examples 1 and 2, the molded articles of all the respective embodiments exhibit the pesticidal activity. Particularly, the molded article mixed with the fibrous inorganic filler exhibits an excellent sustained release.

10 The molded article of each embodiment has a sufficient strength, heat resistance and the like.

15 As described above, with the pesticidal resin composition of the present invention, it is possible to obtain a pesticidal product that has such a heat resistance and chemical resistance as to enable the resin composition to be used as a structural member or the like, as well as being capable of exhibiting the pesticidal activity for a prolonged period of time.

CLAIMS

1. A pesticidal resin composition that contains (A) at least one resin selected from polyamide resins and polyacetal resins, (B) at least one compound selected from sulfone amide derivatives, sulfonic acid ester derivatives, phosphoric acid ester derivatives, phosphazene derivatives, carboxylic acid amide derivatives, carboxylic acid ester derivatives, and (C) a chemical agent having a pesticidal property.
2. A pesticidal resin composition according to claim 1, which is mixed with a fibrous inorganic filler.
3. A pesticidal product formed from any one of the pesticidal resin composition according to any one of claims 1 and 2.

ABSTRACT

According to the present invention, there is provided a pesticidal resin composition that contains (A) at least one resin selected from polyamide resins and polyacetal resins, (B) at least one compound selected from sulfone amide derivatives, sulfonic acid ester derivatives, phosphoric acid ester derivatives, phosphazene derivatives, carboxylic acid amide derivatives, carboxylic acid ester derivatives, and (C) a chemical agent having a pesticidal property. With the pesticidal resin composition containing the above ingredients, it is possible to obtain a pesticidal product that has such a strength, heat resistance and chemical resistance as to render the product usable as a structural member, as well as being capable of exhibiting the pesticidal activity for a prolonged period of time.

Declaration and Power of Attorney for Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

私は、以下に記名された発明者として、ここに下記の通り宣言する：

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私の住所、郵便の宛先そして国籍は、私の氏名の後に記載された通りである。

My residence, post office address and citizenship are as stated next to my name

下記の名称の発明について、特許請求範囲に記載され、且つ特許が求められている発明主題に関して、私は、最初、最先且つ唯一の発明者である（唯一の氏名が記載されている場合）か、或いは最初、最先且つ共同発明者である（複数の氏名が記載されている場合）と信じている。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PESTICIDAL RESIN COMPOSITIONS AND

PESTICIDAL PRODUCTS FORMED FROM THE SAME

上記発明の明細書はここに添付されているが、下記の欄がチェックされている場合は、この限りでない：

the specification of which is attached hereto unless the following box is checked:

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この出願の米国出願番号またはPCT国際出願番号は、
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as United States Application Number or
PCT International Application Number
PCT/JP00/00160 and was amended on
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I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application for which priority is claimed

Prior Foreign Application(s)
外国での先行出願

Priority Not Claimed
優先権主張なし

11-009743	Japan	18/1/1999
(Number)	(Country)	(Day/Month/Year Filed)
(番号)	(国名)	(出願日/月/年)
<input type="checkbox"/>		
(Number)	(Country)	(Day/Month/Year Filed)
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<input type="checkbox"/>		

私は、ここに、下記のいかなる米国仮特許出願についても、その米国法典第35編第119条(e)項の利益を主張する。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

(Application No.)	(Filing Date)	(Application No.)	(Filing Date)
(出願番号)	(出願日)	(出願番号)	(出願日)

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(Application No.)	(Filing Date)	(Status: Patented, Pending, Abandoned)
(出願番号)	(出願日)	(現況: 特許許可、係属中、放棄)
(Application No.)	(Filing Date)	(Status: Patented, Pending, Abandoned)
(出願番号)	(出願日)	(現況: 特許許可、係属中、放棄)

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委任状： 私は本出願を審査する手続を行い、且つ米国特許商標庁との全ての業務を遂行するために、記名された発明者として、下記の弁護士及び／または弁理士を任命する。(氏名及び登録番号を記載すること)

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1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

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